Hall Sensor Array for Measuring a Magnetic Field
with Offset Compensation

Abstract

A Hall sensor array for offset-compensated magnetic field measurement comprises a first (1A, 1B) and at least one additional pair (2A, 2B; 2A, 2B, 3A, 3B) of Hall sensor elements. Each Hall sensor element (1A, 1B, 2A, 2B; 1A, 1B, 2A, 2B, 3A, 3B) has four terminals (K1, K2, K3, K4), of which a first and a third terminal (K1, K3) act as power supply terminals for supplying an operating current ($I_{operation}$) and a second and a fourth terminal (K2, K4) act as measurement terminals for measuring a Hall voltage (U_{Hall}). The Hall sensor elements (1A, 1B, 2A, 2B; 1A, 1B, 2A, 2B, 3A, 3B) are so arranged that the current directions of the operating current ($I_{operation}$) in the two Hall sensor elements of each pair are offset at an angle of approximately 90° to one another. The Hall sensor elements (2A, 2B; 2A, 2B, 3A, 3B) of the additional pair(s) are so arranged that their operating current directions are offset at an angle of approximately 90°/n to the operating current directions of the first pair (1A, 1B) of Hall sensor elements, n being the total number of Hall sensor element pairs and $n \geq 2$. The first terminals (K1), the third terminals (K3), the second terminals (K2) and the fourth terminals (K4) of the Hall sensor elements (1A, 1B, 2A, 2B; 1A, 1B, 2A, 2B, 3A, 3B) are respectively connected to each other electrically. The operating current ($I_{operation}$) can thus be supplied over the first and third terminals (K1, K3) of all the Hall sensor elements and the Hall voltage (U_{Hall}) can be measured over the second and fourth terminals (K2, K4) of all the Hall sensor elements (1A, 1B, 2A, 2B; 1A, 1B, 2A, 2B, 3A, 3B).